

European *P. fontinale*. Two Edriophthalmous Crustacea (*Phiboscia Guernei* and *Orchestia Chevreuxi*) and an Ostracod (*Cypris Moniezi*) are also described as new.

The most important special zoological section of the work is a monographic note on the Rotiferous family Asplanchnidæ, a translation of which is given in the present number of the 'Annals,' and to which therefore we need not further refer, except to say, in continuation of the last paragraph, that it includes descriptions of four new species, only one of which (*A. Imhofi*), however, is peculiar to the locality.

M. de Guerne gives a useful table of the terrestrial and freshwater animals now known to inhabit the Azores (omitting the terrestrial Insects), indicating particularly their distribution as observed by himself in Fayal and St. Michael's, with notes on the records of other writers.

In conclusion, the author discusses the general results of the researches made by himself and others upon the fauna of the Azores, and arrives at results which may be summarized as follows:—The terrestrial fauna of the Azores is of distinctly European character, which is still more the case with that of the fresh waters. The species are generally very widely distributed, many of them probably cosmopolite; they seem to have been chiefly conveyed to the Azores by winds and by birds. The peopling of the Azorean fresh waters has been accomplished rapidly, the lakes being of comparatively modern origin. The fecundity and power of adaptation to new media of the introduced animals, coupled with the absence of the struggle for existence, will account for the rapidity with which the waters have become peopled. The marked differentiation of the terrestrial fauna is explained by the facts that the facilities of transport of these types are less and that its origin is much more ancient. The Alpine character of the terrestrial fauna of the Azores maintained by some writers has not been demonstrated.

PROCEEDINGS OF LEARNED SOCIETIES.

GEOLOGICAL SOCIETY.

May 9, 1888.—W. T. Blanford, LL.D., F.R.S.,
President, in the Chair.

The following communication was read:—

"The Stockdale Shales." By J. E. Marr, Esq., M.A., Sec.G.S., and Prof. H. A. Nicholson, M.D., D.Sc., F.G.S.

The Stockdale Shales extend in an E.N.E.—W.S.W. direction across the main part of the Lake District, parallel with the underlying Coniston Limestone Series and the overlying Coniston Flags,

with both of which they are conformable. They also occur in the neighbourhood of Appleby, and in the Sedbergh district. They are divisible into a lower group of black and dark grey and blue Graptolite-bearing shales, interstratified with hard bluish-grey mudstones containing Trilobites and other organisms, and an upper group of pale greenish-grey shales, with thin bands of dark Graptolitic shales. The lower group (Skelgill Beds) is well seen in the stream which runs past Skelgill Farm, and enters Windermere near Low Wood; while the upper group (Browgill Beds) occurs fully developed in the Long Sleddale Valley, and its beds are very fossiliferous in Browgill.

The authors divide these shales into a series of fossil-zones in the following order:—

Stockdale Shales	Browgill Beds	{	Upper	{	Bb 2		
			Bb 1				
	Lower	{	Ba 2	zone of <i>Monograptus crispus</i> .			
			Ba 1	————— <i>turriculatus</i> .			
	Skelgill Beds	{	Upper	Ac 5	————— <i>Rastrites maximus</i> .		
				Ac 4	————— <i>Acidaspis erinaceus</i> .		
				Ac 3	————— <i>Monograptus spinigerus</i> .		
				Ac 2	————— <i>Anopyx aloniensis</i> .		
				Ac 1	<i>Monograptus Clingani</i> band.		
				Ab 6	Barren band.		
	Middle	{	Ab 5	zone of <i>Monograptus convolutus</i> .			
			Ab 4	————— <i>Phacops glaber</i> .			
			Ab 3	————— <i>Monograptus argenteus</i> .			
			Ab 2	————— <i>Encrinurus punctatus</i> .			
Lower	{	Ab 1	————— <i>Monograptus fimbriatus</i> .				
		Aa 2	————— <i>Dimorphograptus confertus</i> .				
		Aa 1	————— <i>Diplograptus acuminatus</i> & <i>Atrypa flexuosa</i> .				

Of these zones, the lowest varies, occurring as a thin limestone in Skelgill, with *Atrypa flexuosa*, n. sp., and as Graptolitic shale at Browgill with *Diplograptus acuminatus*, Nich. The others appear to run persistently across the district, with the exception of the zone of *Rastrites maximus*, which has only been discovered in the Sedbergh area. The thicknesses, lithological characters, and fossil contents of these zones were considered, and comparisons made between these beds and the corresponding deposits of other areas. The whole group attains a thickness of from 250 to 400 feet, of which the Skelgill beds usually make up about one quarter.

The authors correlate the Graptolite-zones with those of the Birkhill and Gala groups of Professor Lapworth as follows:—

<i>Lake District.</i>	=	<i>South of Scotland.</i>
Zone of <i>Monograptus crispus</i>	=	Zone of <i>M. exiguus</i> .
„ ——— <i>turriculatus</i>	=	Not separated.
„ <i>Rastrites maximus</i>	=	Zone of <i>R. maximus</i> .
„ <i>Monograptus spinigerus</i> }	=	„ <i>Monograptus spinigerus</i> .
<i>Monograptus Clingani</i> band	=	„ <i>Petalograptus cometa</i> .
Not represented?	=	„ <i>Petalograptus cometa</i> .
Zone of <i>Monograptus convolutus</i> }	=	Zone of <i>M. gregarius</i> .
„ ——— <i>argenteus</i>	=	„ <i>Diplograptus vesiculosus</i> .
„ ——— <i>fimbriatus</i>	=	„ <i>D. acuminatus</i> .
„ <i>Dimorphograptus confertus</i> =	=	„ <i>D. acuminatus</i> .
„ <i>Diplograptus acuminatus</i> =	=	„ <i>D. acuminatus</i> .

The zones of *M. convolutus*, *M. argenteus*, and *M. fimbriatus* contain abundance of *M. gregarius*, and the zone of *Dimorphograptus confertus* also contains *Diplograptus vesiculosus* in considerable numbers.

The beds were also compared with the corresponding beds in Sweden, Bohemia, Bavaria, &c., and the fossils other than Graptolites were shown to occur elsewhere in strata of Llandovery-Tarannon age, from which it was concluded that the Stockdale Shales occupy that horizon.

A fault occurs everywhere between the Middle and Lower Skelgill Beds, except perhaps in the Sedbergh district; but it does not seem to cut out a great thickness of rock, and the authors gave reasons for supposing that it was produced by one set of beds sliding over the other along a plane of stratification.

The beds are found to thicken out in an easterly direction, and the possibility of the existence of land in that direction was suggested.

The authors directed attention to the importance of the Graptolitoidea as a means of advancing the comparative study of the stratified deposits of Lower Palæozoic age.

A description was given of the following new species and varieties:—*Phacops elegans*, Boeck & Sars, var. *glaber*, *Cheirurus bimucronatus*, Murch., var. *acanthodes*, *Cheirurus moroides*, *Acidaspis erinaceus*, *Harpes judex*, *H. angustus*, *Ampyx aloniensis*, *Proetus brachypygus*, and *Atrypa flexuosa*.

May 23, 1888.—W. T. Blanford, LL.D., F.R.S.,
President, in the Chair.

The following communication was read:—

“On the Skeleton of a Sauropterygian from the Oxford Clay, near Bedford.” By R. Lydekker, Esq., B.A., F.G.S.

A description was given of a considerable portion of the skeleton of a Sauropterygian from the Oxford Clay of Kempston, consisting of several upper teeth, most of the mandible (of which the symphyseal region is entire), a considerable number of vertebrae mainly from the “pectoral” and dorsal regions, the greater portion of the two pelvic, and fragments of the pectoral limbs, and a considerable proportion of the pectoral and pelvic girdles. These remains were referred to *Plesiosaurus philarchus*, Seeley, and the various parts described in detail.

The Author discussed the advisability of retaining the forms described by various generic names by Professor Seeley, under the name of *Plesiosaurus*, and stated his intention of employing the latter term in its widest sense for the present. With this definition, the form under consideration was shown to present characters intermediate between those of *Plesiosaurus* and *Pliosaurus*, but was retained provisionally in the former genus. Although a direct link in the chain connecting the two genera, *P. philarchus* was not

regarded as an ancestor of *Pliosaurus*, since teeth undistinguishable from those of the latter genus occur in the Coralline Oolite.

Finally it was concluded that the evidence brought forward was sufficient to render necessary the abolition of the name *Pliosauridæ*, and the inclusion of *Plesiosaurus* and *Pliosaurus* in a single family.

June 6, 1888.—W. T. Blanford, LL.D., F.R.S.,
President, in the Chair.

The following communication was read :—

“ On the Occurrence of *Calcisphæra*, Williamson, in the Carboniferous Limestone of Gloucestershire.” By E. Wethered, Esq., F.G.S., F.C.S.

The small hollow spheres, with varying forms of peripheral appendages, described by Prof. Williamson as *Calcisphæra*, were found in the Carboniferous Limestone of Flintshire, and were suggested by him to be possibly Foraminifera or the reproductive capsules of some marine form of vegetation, although he admitted that no forms hitherto discovered afforded any definite support to this hypothesis. Prof. Judd expressed a belief that the objects were Radiolaria; whilst Mr. Shrubsole discovered similar bodies in the Mountain Limestone near Llangollen, and conjectured that the described forms included both Foraminifera and Radiolaria.

The Author has discovered the *Calcisphæra* in great numbers in the Carboniferous Limestone of Gloucestershire. He discussed the identity of certain calcareous rings $\cdot 005$ in. in diameter, seen in sections of the limestone of Clifton, &c., with siliceous bodies which he had described in a recent paper read before the Society, and gave an account of the calcareous and siliceous forms which were both referable to *Calcisphæra*. He commented upon the character of the carbonate of lime of the calcareous bodies, which presented a granular structure characteristic of the truly organic portion of the limestone, and not a clear crystalline aspect like that of the infilling or replacing calcite; he concluded therefore that the tests had been originally calcareous, and not siliceous replaced subsequently by carbonate of lime. This was urged as a strong argument against regarding the organisms as Radiolaria, and the Author, whilst considering it unwise to come to a decided conclusion, believed it safe to say that they were Protozoa.

June 20, 1888.—W. T. Blanford, LL.D., F.R.S.,
President, in the Chair.

The following communications were read :—

1. “ On the Occurrence of Marine Fossils in the Coal-Measures of Fife.” By Jas. W. Kirkby, Esq. (Communicated by Prof. T. Rupert Jones, F.R.S., F.G.S.)

This paper recorded the discovery of fossils of good marine types in the Fifeshire Coal-measures. This coal-field is of limited extent,

the Coal-measures dipping under the sea towards the east and south. The prevailing fossils are those characteristic of the Coal-measures in other districts, *Anthracosia*, *Anthracomya*, *Anthracoptera*, *Spirorbis*, many fishes, and some few Amphibian remains. Lately a sinking was commenced in the Upper Red beds, below which, and just above a thin band of poor coal, a thick bed of dark shale was passed through, which proved to be tolerably fossiliferous. *Lingula*, *Murchisonia*, and two species of *Bellerophon* occurred. This horizon was subsequently proved elsewhere in the district, and furnished the following fossils from three localities, namely:—*Strophodus sauroides*?, Ag. (teeth and scales); *Rhizodopsis*, sp. (scales); Palæoniscid scales; *Diplodus gibbosus*, Ag.; *Mesodomodus*, sp. n.; *Petalodus Hastingsiæ*; *Discites rotifer*?, Salt.; *Discites*, sp. (with longitudinal ribs); *Discites*, sp. (smooth); *Orthoceras attenuatum*?, Flem.; *Bellerophon Urvii*, Flem.; *Murchisonia (Aclisma) striatula*, De Kon.; *Sanguinolites*, sp.; *Productus semireticulatus*, var. *Martini*, Sow.; *Discina nitida*, Phill.; *Lingula mytiloides*, Sow.; *Lingula squamiformis*; erinoid stems (*Actinocrinus*?) ; plant-remains (obscure).

Reference was then made to the occurrence of similar fossils in the same formation elsewhere, and particularly in the West of Scotland, North of England, and Lancashire. The Author concluded, from the frequency of the beds containing true marine remains, that the Coal-measures were formed in low-lying areas; and that, when the land was slightly depressed, at times the waters of the sea had access to such spots, bringing back species of shells and crinoids that had existed in the Carboniferous-Limestone ocean of an earlier period. Some further remarks were made on the peculiar nature of the ordinary fauna of the Coal-measures; and the Author observed, in conclusion, that no marine deposits have been observed as yet in the Upper Red beds (*d*⁵¹) of the Fife or other Scotch Coal-measures.

2. "On the Occurrence of *Elephas meridionalis* at Dewlish, Dorset." By the Rev. O. Fisher, M.A., F.G.S.

The Author's attention was first drawn to this subject on seeing two molars of an elephant in the Blackmore Museum labelled "Dewlish, Dorset." He at once attributed them to *E. meridionalis*. Subsequently he ascertained that they were part of a find made in 1813 by a Mr. Hall. Dr. Falconer, from rubbings, attributed the teeth to *E. antiquus*; and Dr. Leith-Adams would not allow that they belonged to *E. meridionalis*, because that species had never been found so far west. Last year the author and Mr. Mansel-Pleydell went to Dewlish, and the latter has since continued the workings. The remains have been found high up on the face of a steep chalk scarp facing west, 10 feet below the brow and 90 feet above the existing stream, in such a position as to suggest that the deposit was the result of an undercut of the stream when it flowed at a higher level. It probably lies in the prolongation of a line of fault with a deviation to the east. The following section was given:—

	ft.	in.
1. Chalk rubble	0	10
2. Fine sand and flints, with elephant remains	3	0
3. Sand and ferruginous gravel		?
4. Flint-material, waterworn.....		?
5. Sand, the lower portion with different-sized flints		?

There were no shells or Microzoa.

The Author speculated on the probable lapse of time, and on the importance of the discovery of *E. meridionalis*, a preglacial mammal, so far west. A list of the bones found was given.

MISCELLANEOUS.

Transverse Bone of a Chelonian.

By G. A. BOULENGER.

I REGRET to see that my paper "On the Transverse Bone of a Chelonian" is published in the last No. of the 'Annals' without the corrections which I made on the proof having been attended to*.

Thus, the bone lettered *vom.* on the figure should be *pal.* and the azygous bone should be lettered *vom.*, as may be seen by a comparison with the text.

I now find that I was mistaken in believing in the existence of a transverse bone in *Hydraspis Hilairii*. Professor Stewart, after examining a young specimen of the same species without finding the bone in question, suggested to me that I might have been deceived by the presence of a very deep groove in the jugal, a view which has been confirmed on complete disarticulation of one side of the skull. I had, however, previously taken the precaution of partly detaching the bones, and, finding the suture formed by the anterior and posterior borders of the groove to extend as far inwards as I could see, it did not occur to me that what appeared to be two distinct bones could in reality be but one.

On the "Nursing"-habits of Dendrobates.

By G. A. BOULENGER.

Professor Lütken has kindly drawn my attention to a contribution by Wyman which I had overlooked when writing upon the nursing-habits of Batrachians. The curious habit of *Dendrobates* of

* [This was entirely owing to the Author not having returned his proof before the last day of the month.—W. F.]